

WHAT IS CLAIMED IS:

1. A head substrate of a printing head detachably mounted on a printer main body, comprising:

5 plural external connection terminals individually receiving, from the exterior, a binary logic signal corresponding to whether or not to execute a recording operation, a recording image signal and a clock signal;

10 recording execution means for executing the recording operation according to the recording image signal and the clock signal entered through said external connection terminals, in case said binary logic signal is in a first state;

15 data memory means for executing a memory access which is at least either of data writing and data readout; and

20 memory access means for recognizing said binary logic signal as an access permission signal and executing the memory access to said data memory means at a timing corresponding to the clock signal when said logic signal is in a second state.

2. A head substrate according to claim 1, wherein said external connection terminals include:

25 first common terminal wiring means for supplying said externally entered binary logic signal to said memory access means and to said recording execution means; and

second common terminal wiring means for supplying said externally entered clock signal as a recording clock signal to said recording execution means and as a memory clock signal to said memory access means.

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3. A head substrate according to claim 2, wherein:

10 said recording execution means is adapted for executing the recording operation based on the recording image signal serially entered into one of said external connection terminals; and

15 said common terminal wiring means is adapted for serially supplying said memory access means with the input signal to the same external connection terminal that receives the serial input of the recording image signal, as writing data.

4. A head substrate according to claim 2, wherein:

20 said recording execution means is adapted for executing the recording operation based on the recording image signal serially entered into one of said external connection terminals; and

25 said common terminal wiring means is adapted for serial supply of read data of said memory access means to the same external connection terminal that receives the serial input of the recording image signal.

5. A head substrate according to claim 2,  
wherein:

5       said recording execution means is adapted for  
executing the recording operation based on the  
recording image signal parallel entered into plurality  
of said external connection terminals; and

10       said common terminal wiring means is adapted for  
parallel supplying to said memory access means an input  
signal to said plural external connection terminals  
that receive the parallel input of the recording image  
signal, as writing data,

6. A head substrate according to claim 2,  
wherein:

15       said recording execution means is adapted for  
executing the recording operation based on the  
recording image signal parallel entered into plurality  
of said external connection terminals; and

20       said common terminal wiring means is adapted for  
parallel supplying read data of said memory access  
means to said plural external connection terminals,  
receiving the parallel input of the recording image  
signal.

25       7. A head substrate according to any of claims 2  
to 6, wherein:

      said recording execution means includes a shift

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register which is reset by a reset signal externally entered into one of said external connection terminals and is adapted to temporarily hold and parallel output, at a timing corresponding to the clock signal, the recording image signal serially entered into another of said external connection terminals; and

said common terminal wiring means is adapted for supplying said memory access means with the reset signal for said shift register, as said binary logic signal constituting said access permission signal.

8. A head substrate according to any of claims 2 to 6, wherein:

said recording execution means includes a shift register which is adapted to be reset by a reset signal externally entered into one of said external connection terminals and then to temporarily hold and parallel output, at a timing corresponding to the clock signal, the recording image signal serially entered into another of said external connection terminals, and a latch circuit which is adapted to be reset by said reset signal and then to temporarily hold and output the recording image signal parallel outputted from said shift register; and

said common terminal wiring means is adapted for supplying said memory access means with the reset signal for said latch circuit, as said binary logic

signal constituting said access permission signal.

9. A head substrate according to any of claims 2 to 6, wherein:

5        said recording execution means includes a shift register which is adapted to be reset by a reset signal externally entered into one of said external connection terminals and then to temporarily hold and parallel output, at a timing corresponding to the clock signal,  
10       the recording image signal serially entered into another of said external connection terminals, and a latch circuit which is adapted to be reset by said reset signal and then to temporarily hold and output the recording image signal parallel outputted from said  
15       shift register; and

      said common terminal wiring means is adapted for supplying said memory access means with said reset signal as said binary logic signal constituting said access permission signal.

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10. A head substrate according to any of claims 2 to 6, wherein:

      said recording execution means includes a shift register which is adapted to be reset by a reset signal  
25       externally entered into one of said external connection terminals and then to temporarily hold and parallel output, at a timing corresponding to the clock signal,

the recording image signal serially entered into  
another of said external connection terminals, and a  
latch circuit which is adapted to temporarily hold and  
output the recording image signal parallel outputted  
5 from said shift register at a timing corresponding to a  
latch signal externally entered into still another of  
said external connection terminals; and

10 said common terminal wiring means is adapted for  
supplying said memory access means with said latch  
signal as said binary logic signal constituting said  
access permission signal.

15 11. A head substrate according to any of claims 1  
to 6, wherein said recording execution means includes  
plural recording elements for recording the recording  
image signal parallel outputted from said latch  
circuit, corresponding to a recording pulse signal  
externally entered into one of said external connection  
terminals.

20 12. A head substrate according to claim 11,  
wherein said recording element is a heat generating  
element.

25 13. A head substrate according to any of claims 2  
to 6, wherein said common terminal wiring means is  
adapted to supply said memory access means with the

clock signal for said recording image signal, as a memory clock signal.

14. A head substrate according to any of claims 2  
5 to 6, wherein:

said data memory means is means for executing both data writing and data readout as the memory access;

10 said memory access means is means for selectively executing either of data writing into and data readout from said data memory means corresponding to an externally entered mode switching signal; and

15 said common terminal wiring means is adapted for supplying said memory access means with the input signal to one of said external connection terminals as the mode switching signal.

15. A head substrate according to any of claims 2 to 6, wherein:

20 said recording execution means is adapted for receiving a driving electric power externally entered from one of said external connection terminals; and

25 said common terminal wiring means is adapted for supplying said memory access means with the driving electric power for said recording execution means.

16. A head substrate according to any of claims 2 to 6, wherein said external connection terminals, said

recording execution means, said data memory means, said memory access means and said common terminal wiring means are constituted by films formed on one base substrate.

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17. A printing head detachably mounted on a printer main body, comprising a head substrate according to any of claims 1 to 6.

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18. A printing head according to claim 17, wherein said recording execution means includes plural recording elements for recording.

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19. A printing head according to claim 18, wherein said recording element is a heat generating element.

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20. A printing head according to claim 19, wherein the recording is executed by discharging ink by the heat generated by said heat generating element.

21. A printing head detachably mounted on a printer main body, comprising:

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plural external connection terminals individually receiving, from the exterior, a binary logic signal corresponding to whether or not to execute a recording operation, a recording image signal and a clock signal;



recording execution means for executing the  
recording operation according to the recording image  
signal and the clock signal entered through said  
external connection terminals, in case said binary  
5 logic signal is in a first state;

data memory means for executing a memory access  
which is at least either of data writing and data  
readout; and

memory access means for recognizing said binary  
10 logical signal as an access permission signal and  
executing the memory access to said data memory means  
at a timing corresponding to the clock signal when said  
logical signal in a second state.

22. A printing head according to claim 21,  
15 wherein said external connection terminals include:

first common terminal wiring means for supplying  
said externally entered binary logic signal to said  
memory access means and to said recording execution  
20 means; and

second common terminal wiring means for supplying  
said externally entered clock signal as a recording  
clock signal to said recording execution means and as a  
memory clock signal to said memory access means.

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23. A printing apparatus comprising:  
a printing head according to claim 17;

input means for individually transmitting the binary logic signal of the first state and various signals such as the recording image signal and the clock signal respectively to plurality of said external connection terminals of said printing head, thereby causing said recording execution means to execute a recording operation; and

access control means for transmitting the binary logic signal of the second state and the clock signal, etc. to said plural external connection terminals of said printing head, thereby causing said memory access means to execute the memory access.

24. A printing apparatus comprising:

a printing head according to claim 21;

input means for individually transmitting the binary logic signal of the first state and various signals such as the recording image signal and the clock signal respectively to said plurality of external connection terminals of said printing head, thereby causing said recording execution means to execute a recording operation; and

access control means for transmitting the binary logic signal of the second state and the clock signal, etc. to said plural external connection terminals of said printing head, thereby causing said memory access means to execute the memory access.

25. A printing apparatus according to claim 23,  
wherein:

5 said input means is adapted for serial  
transmission of the recording image signal to a  
specified one of said external connection terminals;  
and

10 said access control means is adapted for serial  
transmission of the writing data for said memory access  
means to one of said external connection terminals in  
which the recording image signal is serially entered.

26. A printing apparatus according to claim 23,  
wherein:

15 said input means is adapted for parallel  
transmission of the recording image signal to a  
specified plurality of said external connection  
terminals; and

20 said access control means is adapted for parallel  
transmission of the writing data for said memory access  
means to said plurality of external connection  
terminals in which the recording image signal is  
parallel entered.

27. A printing apparatus according to claim 23,  
25 wherein said recording execution means includes a heat  
generating element for recording.

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